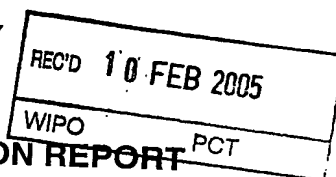# PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PWO-0909	**FOR FURTHER ACTION** See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/CA 03/00309	International filing date (day/month/year) 06.03.2003	Priority date (day/month/year) 04.11.2002
International Patent Classification (IPC) or both national classification and IPC H04B1/16		

Applicant
RESEARCH IN MOTION LIMITED et al.

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 9 sheets.

3. This report contains indications relating to the following items:

I	☒	Basis of the opinion
II	☐	Priority
III	☐	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	☐	Lack of unity of invention
V	☒	Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI	☐	Certain documents cited
VII	☐	Certain defects in the international application
VIII	☐	Certain observations on the international application

Date of submission of the demand 26.05.2004	Date of completion of this report 11.02.2005
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Tzimeas, K Telephone No. +31 70 340-4246

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.   PCT/CA 03/00309

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)):*

Description, Pages

1-14   as originally filed

Claims, Numbers

1-59   received on 13.01.2005 with letter of 13.01.2005

Drawings, Sheets

1/7-7/7   as originally filed

2. With regard to the **language,** all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

☐ the description,   pages:

☐ the claims,   Nos.:

☐ the drawings,   sheets:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.   PCT/CA 03/00309

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	27-59
	No:	Claims	1-26
Inventive step (IS)	Yes:	Claims	27-59
	No:	Claims	1-26
Industrial applicability (IA)	Yes:	Claims	1-59
	No:	Claims	

2. Citations and explanations

    see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1.0   Reference is made to the following documents:
   D1:   US-A-5 794 146 (SEVCIK PETER JOHN ET AL) 11 August 1998 (1998-08-11)
   D2:   EP-A-0 891 050 (AIWA CO) 13 January 1999 (1999-01-13)
   D3:   EP-A-0 490 441 (PHILIPS ELECTRONICS UK LTD ;KONINKL PHILIPS ELECTRONICS NV (NL)) 17 June 1992 (1992-06-17)
   D4:   US 2002/106997 A1 (MEYER KEVIN ET AL) 8 August 2002 (2002-08-08)
   D5:   US-B-6 400 9611 (BOETZEL ULRICH ET AL) 4 June 2002 (2002-06-04)
   D6:   US-A-5 280 650 (SOBTI ARUN) 18 January 1994 (1994-01-18)

2.0   The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1, 23 is not new in the sense of Article 33(2) PCT.

2.1   Regarding claim 1, document D1 discloses (the references in parentheses applying to this document):

A method (see fig. 2; fig. 5) for saving power in a deep sleep mode of a mobile device comprising:

- waking up from the deep sleep mode after a time interval to sample an RF strength of a system (fig.2);
- comparing the sampled RF condition strength to a predetermined level (col.4, line 60- col.5, line 23; col. 5, lines 53-57);
- increasing the time interval if the sampled RF condition strength is less than the predetermined level (col. 4, lines 25-26; col.6, lines 18-28; fig.2)
-entering the deep sleep mode (fig.2).

Therefore claim 1 is not new in the sense of Article 33(2) PCT.

2.2   Regarding claim 23, document D1 discloses (the references in parentheses applying to fig.1 of this document):

A mobile device battery power saving system, comprising:

-a channel processor (18) for providing a flag signal indicating loss of a system channel (col. 5, lines 24-35 and lines 52-57);

- a deep sleep controller (24) for receiving the flag signal and providing a system lost exit flag;

- a variable setting controller (10) for setting deep sleep mode variables in response to the system lost exit flag and for adjusting the deep sleep mode variables in response to control signals (col.5 lines 24-51); and

- a low power controller (18) for iteratively sampling an RF condition parameter at a time interval defined by the deep sleep mode variables and for providing control signals to the variable setting controller when the RF condition fails to improve (col. 4, lines 48-67).

Therefore claim 1 is not new in the sense of Article 33(2) PCT.

2.3   Dependent claims 2-22 and 24-26 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

- the technical features are already known from D1-D6 or they are normal design options.

3.0   Independent claim 27 appears to be novel and inventive. Document D1, which represents the closest prior art discloses:

A method for switching a mobile device to a deep sleep mode comprising:

- monitoring a system channel

However, D1 does not disclose the features of:

- counting the number of times the system channel is lost within a timeout period; and

- entering the deep sleep mode when the system channel count equals a predetermined number.

This technical features solve the objectively determined problem of further saving power.

The features of claim 27 have not been found in any prior art document. Nothing in D1 hints towards the solution of claim 27. Therefore the solution proposed in claim 27 must be considered new and inventive.

3.1   Claims 28-34 are dependent on claim 27 and as such are also new and inventive.

4.0   Independent claim 35 appears to be novel and inventive. Document D1, which represents the closest prior art discloses:

A method for saving battery power in mobile device, the method comprising:

- monitoring a system channel;
- entering a deep sleep mode when the strength of the received signal is below a threshold;
- waking up from a the deep sleep mode after a time interval to sample an RF strength of a system;
- comparing the sampled RF condition strength to a predetermined level,
- increasing the time interval if the sampled RF condition strength is less than the predetermined level; and
- re-entering the deep sleep mode.

However, D1 does not disclose the features of:

- counting the number of times the system channel is lost within a timeout period; and
- entering the deep sleep mode when the system channel count equals a predetermined number.

This technical features solve the objectively determined problem of further saving power.

The features of claim 35 have not been found in any prior art document. Nothing in D1 hints towards the solution of claim 35. Therefore the solution proposed in claim 35 must be considered new and inventive.

4.1   Claims 36-55 are dependent on claim 35 and as such are also new and inventive.

5.0   Independent claim 56 appears to be novel and inventive. Document D1, which

represents the closest prior art discloses:

A mobile device battery power saving system, comprising:

- a channel processor for providing a flag signal indicating loss of a system channel;
- a deep sleep controller for receiving the flag signal;
- a variable setting controller for setting the deep sleep mode variables in response to the system lost exit flag and for adjusting the deep sleep mode variables in response to control signals; and
- a low power controller for iteratively sampling an RF condition parameter and providing the control signals to the variable setting controller when RF condition fails to improve.

However, D1 does not disclose the features of:

- the deep sleep controller counting the number of times the system channel is lost within a timeout period, and providing the system lost exit flag for entering a deep sleep mode when the system channel count equals a predetermined number.

This technical features solve the objectively determined problem of further saving power.

The features of claim 56 have not been found in any prior art document. Nothing in D1 hints towards the solution of claim 56. Therefore the solution proposed in claim 56 must be considered new and inventive.

5.1 Claims 57-59 are dependent on claim 35 and as such are also new and inventive.

6.0 The novelty objections under points 2.1, 2.2 notwithstanding, it is noted that the subject-matter of independent claims 1 and 23 may not be unitary with the subject-matter of independent claims 27, 35 and 56 (Rule 13 PCT).

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What is claimed is:

1. A method for saving battery power in a deep sleep mode of a mobile device comprising:
    a) waking up from the deep sleep mode after a time interval to sample an RF strength of a system;
    b) comparing the sampled RF condition strength to a predetermined level;
    c) increasing the time interval if the sampled RF condition strength is less than the predetermined level; and,
    d) entering the deep sleep mode.

2. The method of claim 1, wherein the mobile device enters the deep sleep mode when a channel of the system is lost a predetermined number of times within a timeout period.

3. The method of claim 1, wherein the step of entering the deep sleep mode includes switching the mobile device to one of a first, second and third level deep sleep modes.

4. The method of claim 3, wherein the step of switching includes setting a maximum loop counter value to a predetermined counter value associated with one of the first, second and third level deep sleep modes.

5. The method of claim 4, wherein the step of switching includes setting the time interval to a predetermined time value associated with one of the first, second and third level deep sleep modes.

6. The method of claim 5, wherein the predetermined time value associated with the second level deep sleep mode is greater than the predetermined time value associated with the first level deep sleep mode.

7. The method of claim 6, wherein the predetermined time value associated with the third level deep sleep mode is greater than the predetermined time value associated with the second level deep sleep mode.

8. The method of claim 1, wherein the step of waking includes determining a system for acquisition from a list of systems associated with one of the first, second and third level deep sleep modes.

9. The method of claim 8, wherein the list of systems includes a first system list, a second system list and a third system list associated with the first, second and third level sleep modes respectively.

10. The method of claim 9, wherein the first system list is a subset of the second system list and the third system list, and the second system list is a subset of the third system list.

11. The method of claim 1, wherein the step of comparing includes comparing the signal to noise ratio of the RF condition to a predetermined value.

12. The method of claim 4, wherein the step of comparing includes setting a mobility flag to true if a Pseudo Noise of the system is unknown.

13. The method of claim 4, wherein the step of comparing includes setting a mobility flag to true or if the mobile device is moving.

14. The method of claim 12, wherein a phase of the Pseudo Noise is monitored for determining mobility of the mobile device.

15. The method of claim 12, wherein the mobile device returns to one of an idle state and the first level deep sleep mode when the mobility flag is true.

16. The method of claim 15, wherein the step of comparing includes

(i)   incrementing a loop counter when the mobility flag is false;

(ii)   comparing the loop counter value to the maximum loop counter value; and,

(iii)   switching the mobile device to one of the second and third level deep sleep modes when the loop counter value equals the maximum loop counter value.

17. The method of claim 16, wherein step (iii) includes switching the mobile device to the second level deep sleep mode when the mobile device is in the first level deep sleep mode.

18. The method of claim 16, wherein step (iii) includes switching the mobile device to the third level deep sleep mode when the mobile device is in the second level deep sleep mode.

19. The method of claim 3, wherein the step of switching includes setting a maximum timeout period to a predetermined timeout value associated with one of the first, second and third level deep sleep modes.

20. The method of claim 19, wherein the step of comparing includes switching the mobile device to one of the second and third level deep sleep modes when the maximum timeout period expires.

21. The method of claim 1, wherein the step of switching the mobile device to one of the second and third level deep sleep modes includes switching the mobile device to the second level sleep mode when the mobile device is in the first level deep sleep mode.

22. The method of claim 1, wherein the step of switching the mobile device to one of the second and third level deep sleep modes includes switching the mobile device to the third level deep sleep mode when the mobile device is in the second level deep sleep mode.

23. A mobile device battery power saving system, comprising:

a)   a channel processor for providing a flag signal indicating loss of a system channel;

b) a deep sleep controller for receiving the flag signal and providing a system lost exit flag;

c) a variable setting controller for setting deep sleep mode variables in response to the system lost exit flag and for adjusting the deep sleep mode variables in response to control signals; and,

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d) a low power controller for iteratively sampling an RF condition parameter at a time interval defined by the deep sleep mode variables and for providing the control signals to the variable setting controller when the RF condition fails to improve.

10   24. The mobile device battery power saving system of claim 23, wherein the system channel includes one of a pilot channel and a paging channel.

25. The mobile device battery power saving system of claim 23, wherein the deep sleep mode variables include a timer value for setting the time interval and a loop count

15   value for setting a number of iterations.

26. The mobile device battery power saving system of claim 23, wherein the RF condition parameter includes a signal to noise strength ratio.

20   . 27. A method for switching a mobile device to a deep sleep mode comprising:
a) monitoring a system channel;

b) counting a number of times the system channel is lost within a timeout period; and,

c) entering the deep sleep mode when the system channel count equals a predetermined number.

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28. The method of claim 27, wherein the step of monitoring includes monitoring one of a pilot channel and a paging channel of the system channel.

29. The method of claim 27, wherein the step of monitoring includes resetting a

30   channel lost counter and a channel lost start time value.

30. The method of claim 29, wherein the step of counting includes incrementing the channel lost counter each time the system channel is lost.

31. The method of claim 30, wherein the step of incrementing includes setting the channel lost start time value to a first current Global Positioning System time when the channel lost counter value is one.

32. The method of claim 31, wherein the step of incrementing includes setting a channel lost end time value to a second current Global Positioning System time when the channel lost counter value has reached the predetermined number.

33. The method of claim 32, wherein the mobile device enters the deep sleep mode when the difference between the channel lost end time value and the channel lost start time value is at least the timeout period.

34. The method of claim 33, wherein the step of entering includes resetting the channel lost counter and the channel lost start time value after the mobile device enters the deep sleep mode.